

Induction of carbamate resistance in brown planthopper

Teh-chi Chung, Chih-ning Sun, and Huei-lian Kao, Entomology Department, National Chung-Hsing University, Taichung, Taiwan 400, China

Brown planthopper (BPH) adults were collected in April 1977 from a rice paddy at Ping-tung, Taiwan, and

brought to the laboratory. They were fed on rice at room temperature with a 16-hour photoperiod. This strain was reared continuously in the laboratory without contact with insecticides until July 1979, when selection with MIPC started. In October 1979 the insects were mixed with field populations from Ping-tung and Mei-nung areas and subjected to a continuous and increasing selection

pressure of MIPC (causing about 60% mortality). The LC_{50} , as measured by the spray method, increased from 0.025 mg/ml to 0.673 mg/ml, an induction of carbamate resistance by 27 times in 4 generations of selection.

This is believed to be the first reported case of selection for carbamate resistance in brown planthopper in the laboratory. ■

Sustenance of whitebacked planthopper throughout the year in the Indian Punjab

K. K. Shukla and A. K. Gupta, Genetics Department, Punjab Agricultural University, Ludhiana, India

Under north Indian conditions, whitebacked planthopper (WBPH) *Sogatella furcifera* (Horv.) populations normally appear in July. If insect rearing begins in July, the high population required for mass screening is obtained only by August and screening for resistance is limited to August-September.

The active period of screening can be prolonged if a high population of WBPH is available through March-April. This means maintaining WBPH in November to January so that sufficient numbers of mating pairs are available by February-March and a high population is available by April.

Earlier attempts to rear WBPH on caged plants indicate the WBPH could not be maintained beyond September. This report describes successful rearing through the year on caged plants under laboratory as well as natural conditions.

Rice plants were grown in pots outdoors from April to November. From December to March, when the climate was not favorable, the rice plants were kept in the laboratory (22°-27°C temperature and 70-80% relative humidity) with an ordinary room heater and Philips Reflectalite fluorescent tubes. The laboratory-grown plants were kept outdoors during the day and taken to the laboratory in the evening.

One-month-old plants were covered with split cages and 50 pairs of newly emerged WBPH adults (less than 24

hours old) were released for oviposition. The insects were removed after 2 days and the plants were observed daily until the emergence of new WBPH adults. The time from adult release to nymphs hatching was called the hatching period and the period between hatching of nymphs and the appearance of adults was the nymphal period. The generation was measured as the time from initial hatching to hatching of nymphs of the next generation (Table 1).

The caged pots were kept outdoors under natural conditions throughout the year. Eleven generations were obtained from August 1978 to September 1979.

During the period December to March, one duplicate set of insect rearing pots was maintained in the laboratory. Four additional generations were obtained during this period (Table 2).

Screening rice genetic stocks for resistance was conducted with this high population of *artificially* reared insects in the screenhouse from mid-March 1979 till late October 1979 when rice seedlings could be raised in the laboratory. This allowed an active screening period of 7-8 months instead of the normal 2. ■

Table 1. Development of caged whitebacked planthoppers held outdoors. Ludhiana, August 1978–September 1979.

Period	Mean temp (°C)	Mean relative humidity (%)	Nymphal period (days)	Hatching period (days)	Generation time (days)
1 Aug–Sep	28.3	72.7	15	10	25
2 Sep–Oct	24.8	63.6	19	12	31
3 Oct–Dec	18.8	63.7	20	20	40
4 Dec–Mar	13.4	71.2	58	33	91
5 Mar–Apr	20.1	65.6	26	7	33
6 Apr–May	28.5	39.4	14	6	20
7 May	28.8	37.8	13	10	23
8 May–Jun	31.2	37.3	15	8	23
9 Jun–Jul	31.7	63.5	17	8	25
10 Jul–Aug	29.9	71.9	15	8	23
11 Aug–Sep	30.7	64.0	16	8	24

Table 2. Development of whitebacked planthoppers in the laboratory. December 1978–March 1979.

Period	Nymphal period (days)	Hatching period (days)	Generation time (days)
1 Dec	11	8	19
2 Dec–Jan	13	8	21
3 Jan–Feb	13	8	21
4 Feb–Mar	12	7	19
5 Mar	13	8	21